BUROHAPPOLD ENGINEERING

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Utilities Planning Report

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1 Introduction

This document has been prepared by BuroHappold Engineering to support the planning application for the redevelopment of Northumberland Development Project generation area. The document outlines, based upon the present stage of investigations, the local utility networks and necessary on and off site utility construction works.

This Utility Strategy report reviews the existing facilities on site and identifies any relevant site constraints. The requirements for utilities have been determined from examination of the development proposals, as set out in the Development Specification. The demand for utilities has been estimated and initial discussions with the incumbent utility companies held.

The report identifies the anticipated need for on site improvements and off site reinforcements, based upon initial estimations. Further detailed work may be required as the development is realised.

The Strategy identifies certain design criteria and conceptual options for addressing the utility engineering requirements associated with the development.

The report provided details of the following areas:

- Water
- Power
- Gas
- Telecommunication
- Other Infrastructure.

In each section the key phases of works are identified.

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2 Existing Site Constraints

2.1 Infrastructure Constraints

The Project Site application site is bounded by the following public highways:

- Tottenham High Road - runs north/ south and forms the western boundary
- Northumberland Park runs east/ west and forms the northern boundary
- Worcester Avenue runs north/ south and forms the eastern boundary
- Park Lane runs east/ west and forms the southern boundary

The High Road, and to some extent Northumberland Park, are major infrastructure routes, and will clearly impose significant restrictions on how and where new utilities enter the site

Surveys at key locations have confirmed that the eastern footpath of the High Road is extremely congested, which further limits where new infrastructure can be accommodated.

2.2 Existing Utility Network

The existing utility networks have been sized to serve the existing local area and also provide interconnectivity to the network as a whole. The utility loads of the site's former and present uses impose much lower demands than those required for the proposed development as the proposed built areas are greater and to a higher specification. Whilst there has been a significant amount of capacity released back into the network as existing buildings have been demolished and further will be released when the existing stadium is demolished, off site re-enforcement will be required. In particular :

1. the electrical supplier (UK Power Networks (UKPN)) indicate that the existing 33kV and 11kVpower networks will require significant reinforcement, offsite, to the west and south.
2. discussions with Thames Water Utilities (TWUL) indicates that the potable water infrastructure will require minor reinforcement works.
3. The new development places a much higher level of demand on data networks, plus there is a requirement to improve resilience, hence new links to the main exchanges are to be provided.

A series of off-site reinforcement and supply measures have been discussed with the utility companies and principles have been established to provide appropriate levels of utility supply and resilience to the proposed development.

2.3 Strategic Utility Infrastructure

Based on information received there is no nationally significant strategic infrastructure effected by the proposals.

2.4 Water

Thames Water Utilities Ltd (TWUL) is the incumbent water company that supplies potable water to the new development area.

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There is a trunk main in the High Road and there are a number of distribution mains running around the perimeter of the site, with six potable water supply mains of varying sizes currently supplying the development area.

2.5 Power

UK Power Networks (UKPN) is the incumbent network operator (DNO) that owns and operates the high voltage (HV) and low voltage (LV) electrical infrastructure within the region. The new development area is part of UKPN's eastern network.

There are various 11kV cable routes running around the perimeter of the site. Four existing substations / ring main units have been removed from the site and replaced with two within the North building (Lilywhite House) and one in the south west corner of the existing stadium (for the existing stadium only). At the time of writing, all electrical services in the centre of the development areas have been removed or disconnected to enable the construction of the new stadium.

All these substations are fed from UKPN's Bruce Grove 33/11kV primary substation, located approximately 1km to the south-west of the site.

2.6 Gas

National Grid Gas (NGG) is the incumbent network operator for high, intermediate, medium and low pressure gas infrastructure within the region.

NGG record drawings indicate that there is a medium pressure (MP) gas main that runs from White Hart Lane, north along High Road and then into Northumberland Park. This was recently renewed under a separate contract by the North London Gas Alliance.

There are numerous low pressure mains around the perimeter of the development with 12no services entering into the development.

2.7 Telecommunications

British Telecom (BT), Vodafone (ex-Cable and Wireless and Mercury) and Virgin Media (VM) all have infrastructure around the development area. BT has significant telecoms infrastructure in High Road, Northumberland Park and Park Lane. This infrastructure occurs on both sides of the carriageway, in order to maintain separate diverse routes and to serve properties on each side.

BT had several connections entering the development site. New BT provision has been made to the Lilywhite House development. The existing BT connections within the Wingate trading estate have all been disconnected as the buildings have been demolished. The BT infrastructure serving the remaining business on Paxton Road is to be removed in the Autumn of 2015 There remain BT cables serving the existing stadium, but these do not form part of strategic network routes serving other areas.

In total 9 no BT telecoms points entering into the development area have been identified from the record drawings. All of these points serve customers within the development area, and do not form part of a strategic network that serves other areas.

Vodafone has a strategic east-west link running in the High Road and Northumberland Park. The Vodafone (Cable and Wireless) route in Paxton Road has been diverted and the equipment in Paxton Road is redundant.

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In a similar manner to BT, Virgin had several connections entering the development site. New Virgin provision has been made to the Lilywhite House development. The existing Virgin connections within the Wingate trading estate have been disconnected as have the cables serving on Paxton Road. These do not form part of strategic network routes serving other areas.

In a similar manner to BT, Virgin Media has significant infrastructure around the perimeter of the development, with 7no routes entering the development area. All of these points serve customers within the development area, and do not form part of a strategic network that serves other areas.

2.8 General

Detailed record drawing information has been received from the incumbent utility providers for their respective networks and this has been plotted onto a combined existing utilities drawing.

Each of the utility companies has been consulted to understand the "high level" impact of the new development on their networks and key assets, and have been asked to produce network studies for reinforcement.

Furthermore, detailed discussions are being held with the utility companies to understand the level of diversion work required and which mains need to be replaced and under what timescales. The extent of these more detailed discussions is outlined in the subsequent sections of this report.

Note that diversions have already commenced and been completed as part of an enabling works package to assist with the early stages of the construction program.

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3 Phasing

3.1 General

The Project progresses in a number of stages and the utility infrastructure changes and upgrades need to follow and in some cases pre-empt each stage.

Diversions and new supplies for Lilywhite Home and Sainsbury's supermarket are now complete.

Key steps, to enable the new stadium construction, have been ;

1. Removal of utilities between Lilywhite House and the existing stadium,
2. Diversion of the electrical supply position to the existing stadium, now located off Park Lane.
3. Closure of Paxton Road, transfer to the ownership of THFC and removal of services.

The utility supplies to the existing stadium will remain in place as the new utilities to the new stadium are installed.

Once the existing stadium is closed, the existing utilities are then removed or made safe, and the existing stadium demolished, provisionally commencing June 2017.

Only following the demolition of the existing stadium can the new stadium can be completed and brought into use and the southern development commenced.

The Southern Development is likely to be constructed in two or more phases, with separate infrastructure to each phase.

Presently, the hotel, THFC Experience and Extreme Sports Building are planned to precede construction of the four residential towers and associated commercial space.

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4 Water Supply

4.1 Existing Network

Thames Water Utilities Ltd (TWUL) is the incumbent water company that supplies potable water to the region, including the new development area.

There is a 400mm (16") diameter trunk main and 150mm (6") secondary distribution main that run north/ south under the High Road footway along the western boundary of the site. The trunk main supplies a wider area of north London, and also feeds the secondary distribution main network local to the site. The secondary distribution main is part of Thames Water's District Metered Area (DMA) 83. There is a 150mm branch that comes from the secondary main that runs east along Northumberland Park. Park Lane is served from a separate District Metered Area (DMA 80). Although connected to DMA 83, a valved connection keeps these networks hydraulically separate.

There are seven main potable water connections into the existing White Hart Lane Stadium. These are as detailed below:-

- Meter reference 98A 800 426 into North Stand from Paxton Road.
- Meter reference 04A 051 008 into North Stand from Paxton Road.
- Meter reference 02W 017 957 into East Stand from Worcester Avenue.
- Meter reference 95W 002 528 into South Stand from Park Lane.
- Meter reference 95W 008 087 into South Stand and West from Park Lane.
- Meter reference 97M974 102 into Club Shop.
- Meter reference 00M 256 703 into Bill Nicholson Way believed to serve Valentino's.

New water connections from Northumberland Park have been provided for the Lilywhite House development. This is supported by completed off-site strengthening works carried out by TWUL.

4.2 Design Constraints

All of these connections will be removed once the existing stadium is demolished.

At the outset of the project, Thames Water was provided with an anticipated peak demand for the development. This peak demand did not assume there would be any water demand reduction options (such as waterless urinals etc) incorporated into the design. Discussions with Thames Water have been continuing through the development of the design to ensure that the water needs of the stadium and other related developments can be met.

Thames Water has noted that there will be some off-site reinforcement works required in order for the new load not to adversely affect the supplies to existing developments.

4.3 Demand Assessment

The benchmarks used to estimate the peak loads are presented in the following table:

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Table 4—1 Water benchmark sources and peak demands

Area	Water Benchmark	Peak Water Demand (l/s)
Stadium	Data used from existing stadium site and Benchmarked from Emirates	10.0

4.4 Water Supply Strategy

An application has been made for a new supply to serve the Stadium which also serves the Tottenham Experience but no application has yet been made for the Hotel or the southern residential. It is proposed to provide a new 125mm dia MDPE connection from the existing 6" distribution main in the High Road to serve the stadium. This will feed the proposed 200m3 storage tanks in the new stadium. The incoming connection will also serve the 185m3 sprinkler tanks in the basement of the new stadium.

The new connection will be made from the distribution main in the High Road to serve the new stadium, and this new main will also follow the perimeter of the stadium to the south to serve a new fire hydrant position on the site. This connection will provide all of the water needs to the stadium. An existing valve on the trunk main will be opened by Thames Water to reinforce the supply to the secondary distribution main to allow the stadium supply to be services. The existing valve is close to the new connection to the distribution main. It is also proposed to re-use the existing 6" main in the High Road to serve a new hydrant position at the northern most point of the stadium.

4.5 Reinforcement Requirements

Based on the initial flow rates sent to TWUL for their analysis, it was determined that in order to support the development, reinforcement work would be required in the following locations:-

Stadium

- Opening a currently shut valve on the 200mm dia connection between existing 400mm (16") dia trunk main and existing 150mm (6" dia) inlet main to network main DMA80 in the High Road east footway.
- Formal application for the hotel will be made shortly

Extreme Sports, Residential, North East Building

- No formal application has yet been made for the buildings requiring Outline planning permission.

4.6 Phasing

It is intended that the connection for the stadium will be complete in 2015 and will be used for Construction site uses until it becomes the permanent supply for the stadium.

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5 Power Supply

5.1 Existing Network

UK Power Networks (UKPN) Energy are the incumbent network operator (DNO) owns and operates the high voltage and low voltage electrical infrastructure within the region, including the new development area.

UKPN record drawings identified 5no 11kV/400V local substations within the development boundary.
These are listed in Table 5—1 below and no longer form a constraint on the Stadium construction.

Table 5—1 Details of existing substations

Name	Rating	Notes
Bennetts Close	750kVA	Bennetts Close substation has been replaced with two new substations – one RMU and substation serving the new supermarket, one substation serving the remainder of the Lilywhite house development
Moselle	750kVA	Disconnected & removed
Edward Barber	315kVA	Disconnected & removed
Paxton Road	2.2MVA	Replaced with RMU in south west corner of existing stadium, off Park Lane, supplies existing stadium only. Paxton Road RMU removed. Stadium connection to be removed prior to provision of supply to Phase 3.
Ex Paxton Road	-	Disconnected and removed

5.2 Design Constraints

UKPN has advised in 2010 that there is a significant shortfall in the current capacity of the 11kV network serving the area, however there is a general upgrade of Bruce Grove running from 2015 to early 2017 to which no specific contribution has been requested. This general upgrade involves new cable routes from Northumberland Park to the east, via Park Lane to the existing Bruce Grove primary substation to the south west.

As a consequence the maximum demand of the Stadium, 6MVA, from the 11 kV infrastructure will not be available until an as yet unconfirmed date in early 2017.

The physical infrastructure will precede the availability of the full capacity program in 2016 determined by the Stadium construction program.

As an independent connection, sufficient capacity does exist for construction purposes, notionally 1 MVA, from the existing local 11kV network.

For the southern development multi-use development (residential, hotel, sports) the release of the existing 2.2 MVA White Hart Lane stadium supply will help, however there is a possibility of further off site works being required when this application is submitted. The present scheme is estimated to have a demand of approximately 4 MVA.

Ancillary buildings, namely the THFC retail area and the North East building will also require power, which we anticipate as being available from the local Low Voltage UKPN network.

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5.3 Demand Assessment

5.3.1 Stadium

The load assessment for the Stadium continues to be developed with the design of the Stadium, presently not exceeding 8 MVA under any match day scenario, and not exceeding 4 MVA on a non-match day.

The match day load can be split into six distinct parts of comparable sizes, some of which remain provisional.

1. Pitch lighting
2. Display screens
3. Cooling
4. Catering
5. Technology (IT, Security, Wi-Fi, 4G Wireless, Media)
6. General lighting and power.

The total of the above is in the order of 12 MVA however peak loads for each element are of relatively short duration and do not occur concurrently, hence the 8 MVA match-day maximum demand. This diversity factor has been informed by post-occupancy measurements at the Emirates stadium, equipment design plus load profiles from the THFC project team for IT and KCCJ (Catering loads).

This match day maximum demand is supported by the 6 MVA utility supply and on site power generation.

On non-match-days all loads are significantly reduced, and within the 6 MVA utility supply capacity.

In comparison with that drawn at the Emirates, a stadium of similar capacity, we expect the electrical load to be higher, due to the greater built area and higher level of service provision.

5.3.2 Southern Development – Residential

The southern development residential blocks and ancillary spaces have been assessed as having a maximum utility load of 3 MVA, which is based on units not having any electric heating and a minimal amount of mechanical cooling systems.

2 MVA of the total is for the true residential areas, 2 kVA per residence plus common areas. Each residence will have a dedicated utility meter.

The balance of 1 MVA is for the commercial, community and parking areas, the dominant element of this being an allowance of 100 W/m2 for the commercial space.

A supply application has yet to be made to UKPN or 3rd party suppliers (IDNOs).

5.3.3 Southern Development – Hotel

The hotel is a single entity metered at one point, air conditioned throughout, with a maximum demand in the order of 600 kVA. An allowance of 100 KVA has been made for Catering.

The design is at an early stage so a supply application has yet to be made to UKPN or 3rd party suppliers (IDNOs).

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5.3.4 Southern Development – THFC Retail

The THFC retail unit is a single entity metered at one point, air conditioned throughout, with a maximum demand in the order of 300 kVA.

The brief development is at an early stage so a supply application has yet to be made to UKPN or 3rd party suppliers (IDNOs).

5.3.5 North East Building

The NE building development is a single entity metered at one point, air conditioned throughout, with a maximum demand in the order of 300 kVA. This is based on a general commercial maximum demand of 200 kVA plus, following identification of specialist occupiers, an allowance for 100 kVA specialist equipment

The brief development is ongoing and a supply application has yet to be made to UKPN or 3rd party suppliers (IDNOs).

5.3.6 Summary

A simple summation of the loads above give a match day maximum demand of 10 MVA and non-match day demand of 8 MVA. However we anticipate these will both reduce by 2 MVA due to non-concurrent load profiles.

5.4 Power Supply Strategy

The dedicated stadium supply of 6 MVA will meet the non-match day load and match day match continuation loads as a minimum, with the on-site Generators meeting the maximum load of the Stadium in excess of the this figure.
We are presently recommending a 6 MVA supply as no more costly than 4 MVA.

For details on the Power supply enquiries for the Stadium refer to the Stadium Electrical Design Note Rev 04, issued 17/12/2014.

Orders have been placed with UKPN for the stadium supply. UKPN will be resolving the implementation details, including 3rd party permits as part of their construction processes.. Refer to diagram overleaf for key issues.

No site wide CHP system is now proposed.

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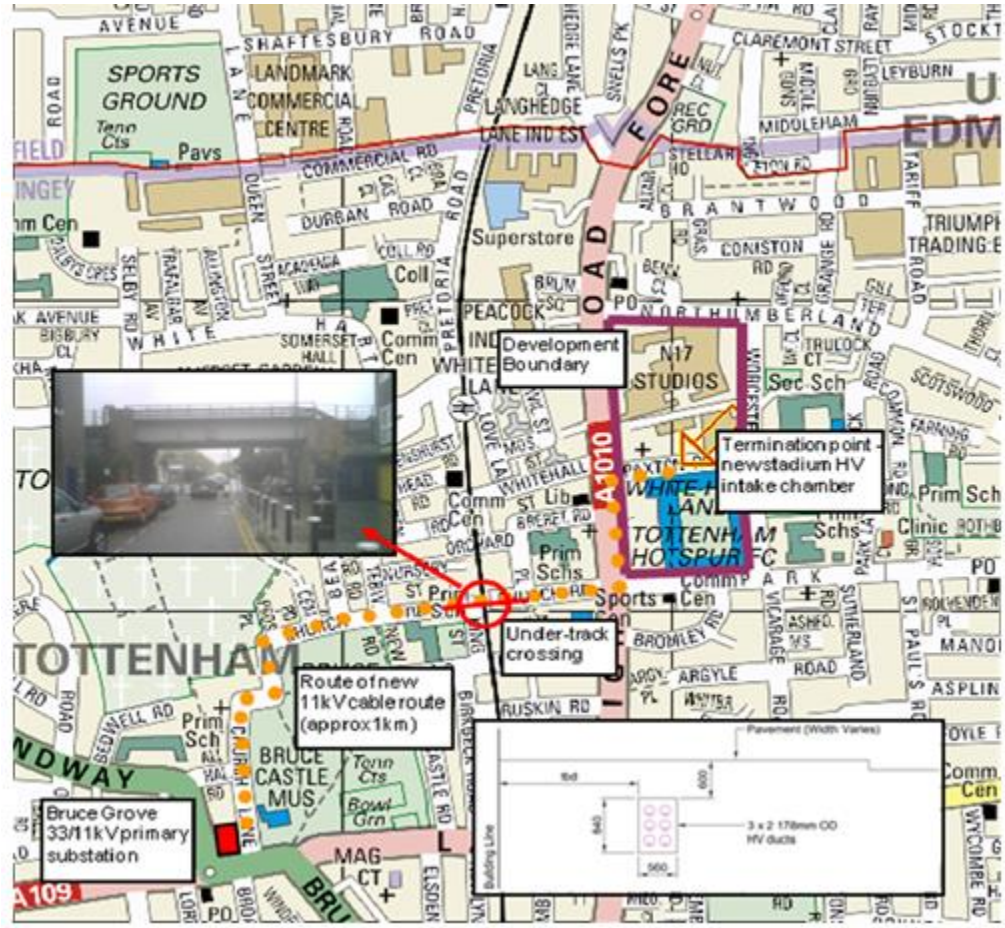

Figure 5—1 Potential route for 11kV works

5.5 Phasing

Due to the completion of the Enabling Works in 2014, phasing impacts for the Stadium are largely absent, other than the delay in availability of the full capacity.

The phasing due to the Residential / Hotel construction in parallel with the Stadium may cause complications but with no firm program for the this part of the development, planning has not being considered.

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6 Gas Supply

6.1 Existing Network

Transco has recently revised its name and operations such that they are now known as National Grid Gas. Whilst National Grid Gas owns the gas assets, independent utility providers, for example, Fulcrum Connections and Exoteric Solutions, are often asked to execute modifications to, or to design sections of gas network. Each company has been consulted in relation to the new development.

National Grid Gas record drawings indicate that a medium pressure main runs along White Hart Lane, turning north into High Road, and then west into Northumberland Park. The main was subject to separate modernisation and upgrade works undertaken by the North London Gas Alliance (NLGA) in 2008.

The medium pressure main feeds various low pressure mains via a pressure reducing station in Trulock Road. These low pressure services then supply the surrounding areas, including the development.

The twelve main low pressure gas connections into the development are as detailed below:-

- 125mm PE gas main from High Road into Wingate Industrial Estate made redundant and removed
- 90mm PE main from High Road main made redundant and removed
- 90mm PE gas main from High Road into Paxton Road, now disconnected from the High Road. (note this was closed off by a Distribution Boundary Valve)
- 125mm PE gas main from High Road into Bill Nicholson Way
- 90mm PE gas main from Park Lane to property
- 90mm PE gas main from Park Lane to existing stadium
- 90mm PE gas main from Park Lane into Worcester Avenue, connecting to Paxton Road main. Strengthening works has been carried out in Worcester Avenue and Paxton Road link removed.
- 3 x 90mm PE and 1 x 63mm PE gas main from Northumberland Park into industrial estate made redundant and removed.
- 63mm PE gas main from Worcester Avenue into industrial estate made redundant and removed
- New gas supplies laid into Lilywhite house.

6.2 Design Constraints

National Grid Gas has been consulted and an approved gas safe installer appointed to undertake the following works:

- A new Low Pressure gas supply made into the main in the High road, across the High Road and terminated within the Site Boundary adjacent to the Lilywhite house entrance ramp.
- A second visit will be made once the stadium meter room is built to install the meter and MP gas booster set.
- Risk assessments carried out by National Grid Gas

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- Security, access maintenance etc.

The strategy will be developed as part of the detailed design process.

6.3 Design Assessment

The gas demand will need to supply the heating and hot water demands of each individual buildings in the development as well as any catering requiring gas supply. The benchmarks used to estimate the demands are presented in the next table.

Table 6—1 Gas benchmark sources and peak demands

Area	Gas Benchmark	Peak Gas Demand
Stadium	Data used from other BH projects, notably Emirates Stadium	10.00MW
Tottenham Experience	Data used from other BH projects	Included in Stadium demand
Extreme Sports	Based on preliminary calculations	150kW
Residential	Based on preliminary calculations	3360kW
Hotel	Based on preliminary calculations	2000kW
NE Building	No Gas Required.	N/A

6.4 Gas Supply Strategy

For the stadium and remainder of the site, it is envisaged that a single connection to the Low pressure main in High Road will be made opposite the Lilywhite House access ramp with the connection crossing the High Road to enter the stadium site in the north west corner. National Grid Gas has confirmed that the low pressure main is capable of supplying the required load to the development.

The low pressure service to the stadium will terminate with an emergency control valve (ECV) within purpose built enclosure, as required by regulations. From this point, the service to the stadium will be picked up by the stadium design team.

It is anticipated that there will also be a connection to the low pressure cast iron main in Park Lane to serve the southern half of the development. It is the intention at this point to re-use an existing 90mm PE connection. The proposed energy strategy makes it likely that there will be no requirement for gas to the residential areas, for cooking. Heating and hot water will be catered for by connection to the central heating system. Cooking will be electric.

6.4.1 Phasing

New supplies have been provided and are in use serving Lilywhite house and the supermarket. Strengthening works have been completed in Worcester Avenue to allow removal of the Paxton Road gas main once it is no longer needed.

The new stadium supply is being laid into the edge of the site in the summer of 2015 as enabling works and is to be continued into the stadium gas enclosure as part of the main stadium construction.

Once the stadium gas supply has been completed, no further gas supply will be needed within the development until the hotel is constructed, where the existing gas main previously capped off can be re-used.

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7 Telecommunications

7.1 Existing Networks

Services from all three major telecoms and broadband providers exist in the highways around the development site as described below.

BT record drawings indicate that there is extensive existing infrastructure on all sides of the development. This includes multiple duct services on both sides of the surrounding carriageways, however, it should be noted that there is duct congestion and duct damage in some of the routes. Main BT infrastructure enters the development in nine locations. There are no primary cross connections through the development, meaning the infrastructure entering the development zone only serves facilities within it. There are no major diversions required of the BT infrastructure in the development site. The services in Paxton Road and in the demolished Wingate Industrial estate have been back to the main infrastructure in the High Road as part of the enabling works.

In addition, public telephone call boxes exist on the north side of Northumberland Park, on the High Road south of Park Lane, south of White Hart Lane and north of Northumberland Park. A further telephone call box is currently located at the front of the existing Tottenham megastore on the High Road; this is to be removed by BT as part of the enabling works packages for the stadium development. Public Telephone

Virgin Media record information indicates that there is also extensive infrastructure around the development in the High Road, Northumberland Park and Worcester Avenue. There are no primary cross connections through the development, meaning the infrastructure entering the development zone only serves facilities within it. There are no major diversions required of the Virgin Media infrastructure in the development site. The services in Paxton Road and in the demolished Wingate Industrial estate have been removed back to the main infrastructure in the High Road as part of the enabling works.

Vodafone (Cable and Wireless) record drawings indicate that there are two primary routes that run east-west across the area, with one running through the development zone, via Paxton Road. This route via Paxton Road has been diverted as part of the enabling works process via High Road and Northumberland Park, and the equipment in Paxton Road is redundant. Vodafone have infrastructure in Worcester Avenue serving the stadiums outside broadcast area to the east of Worcester Avenue.

7.2 Design Constraints

It is not expected that an extensive telecoms infrastructure will be required to run across the site, as the existing infrastructure on each of the boundary edges will provide the necessary services.

The telecoms and broadband suppliers have confirmed that they can provide service to the site, either from their existing networks local to the site or by strengthening their system with additional lines and fibre connections from elsewhere.

Telecoms and broadband connections will be required to all buildings proposed on the site including the residential, hotel, extreme sports and north east building in addition to the stadium.

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7.3 Design Objectives

To address future technology and business trends there are a number of key criteria that will be considered for the communications infrastructure including:

- No single point of failure, resilience and adaptability;
- Infrastructure for multiple telecoms and broadband operators;
- Infrastructure for tenants and new development operator/ maintainer;
- Minimised civil engineering works;
- Co-ordination with other utilities;
- Installation phased with the development.

Careful consideration will be given for different zones i.e. the telecoms infrastructure required for a large commercial and business zone will be much larger and require more security than a predominantly residential zone.

7.4 Telecoms Supply Strategy

Direct connection to the existing telecoms and broadband infrastructure will be made. The stadium is to have provisions from at least two separate points/providers to maintain a diverse and resilient infrastructure..

It is intended to bring in new services to each of the buildings' telecoms equipment rooms from the following locations.

Table 7—1 Telecoms indicative provision and connection points

Area	Likely Connection points	Potential Providers	Indicative Infrastructure
Stadium intake 1	High Road - East side	BT, Vodafone, Virgin Media	300 lines and fibre connections
Stadium intake 2	Worcester Avenue – West side	BT, Vodafone, Virgin Media	300 lines and fibre connections
Outside Broadcast Compound	Worcester Avenue – East side	BT, Vodafone, Virgin Media	100 lines and fibre connections (Installed and complete)
Supermarket	Northumberland Park	BT, Vodafone, Virgin Media	100 lines and fibre connections (Installed and complete)
Hotel	Park Lane – North side	BT, Vodafone, Virgin Media	100 lines and fibre connections
Tottenham Experience and Retail	Served from Stadium		
Residential and Commercial Space	Park Lane – North side	BT, Vodafone, Virgin Media	1 line per residential unit, plus 50 lines per residential block and fibre connections, 100 line for Commercial space plus fibre connections
Extreme sports	Park Lane – North side	BT, Vodafone, Virgin Media	100 lines and fibre connections
Northern Terrace	High Road – East side or Northumberland Park – South side	BT, Vodafone, Virgin Media	100 lines and fibre connections
North East Building	Worcester Avenue – West side	BT, Vodafone, Virgin Media	100 lines and fibre connections

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It is anticipated that the strategy for the telecommunications network will be a series of multi way ducts and chambers that will be a mixture of BT, other telecoms providers, and estate (BMS, security etc). The duct strategy will be developed further with interested parties as the development progresses, but will follow the main utilities corridor layouts around the perimeter of the stadium.

7.5 Phasing

Elements of telecoms infrastructure require relocation for the development project and this work is being carried out as enabling works in advance of the main development phase. The enabling works are nearing completion in terms of telecoms alterations. As part of the enabling works, the Vodafone (Cable and Wireless) route through Paxton Road has been diverted, Virgin and BT lines in Paxton Road have been removed, BT above ground cabinets on the High Road have been relocated and new telecom and broadband lines provided to the outside broadcast area, supermarket and Lilywhite house. Two BT cabinets and a telephone kiosk on the High Rd north of Park Lane are in the process of being moved.

The telecoms connection points in High Road and Worcester Avenue will be provided to serve the first stages of development with lines and fibre connections together with their associated telecoms infrastructure

Further lines and fibre connections will be provided for the hotel, extreme sports and residential units served from High Road and Park Lane.

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8 Other 3rd Party Infrastructure

8.1 Transport for London Signals, Street Lighting and Signage

There are proposed modifications to the existing signals at the Park Lane / High Road junction, and to the pedestrian crossings on the High Road adjacent to the stadium as part of the highways works package associated with the stadium.

There will also be modifications required to the street lighting, CCTV, road and pedestrian signage on the streets surrounding the development.

These works will be designed and procured by Haringey Council Highways as part of their highway works packages, and do not form part of the works described in this report.

Worcester Avenue may also be partly taken out of public ownership with lighting and other services run from the Stadium. The extent of this is under discussion between THFC and Harringey Borough Council.

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9 Conclusions

The new development can be served with all utilities but there will be off site strengthening required to some utilities.

The required HV electric supply requires strengthening of the strategic UKPN networks at Bruce Grove; this is already in hand as an independent UKPN project due for completion in early 2017. A new 11kV cable route is to be laid from Bruce Grove substation to the site area to provide supply. The order for this work has been placed with UKPN. Additional connections will be made to the local LV and HV networks to supply the other parts of the development in phases to suit construction. A contractors site supply will also be provided.

The gas supply for the stadium is to be taken from the existing low pressure main in the High Road and National Grid Gas have confirmed there is sufficient capacity with no strengthening. The stadium supply is in the process of being laid as enabling works. Connections will be laid for the other parts of the development and be served from the local distribution networks.

The potable water supply for the stadium is to be provided from the existing distribution network in the High Road. Strengthening is required but this consists of opening an existing valve to allow a greater flow from the existing trunk main to the local distribution network. The stadium supply is to be laid and used and a construction site supply until required for the stadium. Connections will be laid for the others parts of the development and be served from the local distribution network.

The telecoms and broadband services to the stadium and the other parts of the development will be provided from the existing infrastructure in the streets around the stadium. Strengthening may be required depending on which providers are use but this will be arrange and carried out by the provider.

The utilities will be provided in stages for the new development to suit the phasing of construction.

Existing utilities serving the existing stadium will be kept in place until the stadium goes out of use and removed at that stage.

An enabling works package has carried out a significant proportion of the utilities removals including removal of HV substations from the areas demolished in advance of the stadium project. The enabling works package also included utilities diversions to assist the construction process. In particular, utilities services have been diverted or removed from Paxton Road, the HV ring main in the stadium has been moved away from the north east corner, BT infrastructure on the High Road has been relocated and replacement outside broadcast infrastructure has been provided. The majority of the enabling works is now complete.

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Appendix A Combined Utilities Drawing

Figure 9—1 Existing combined utilities drawing

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Appendix B Development image Plan

Figure 9—2 Development image

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